



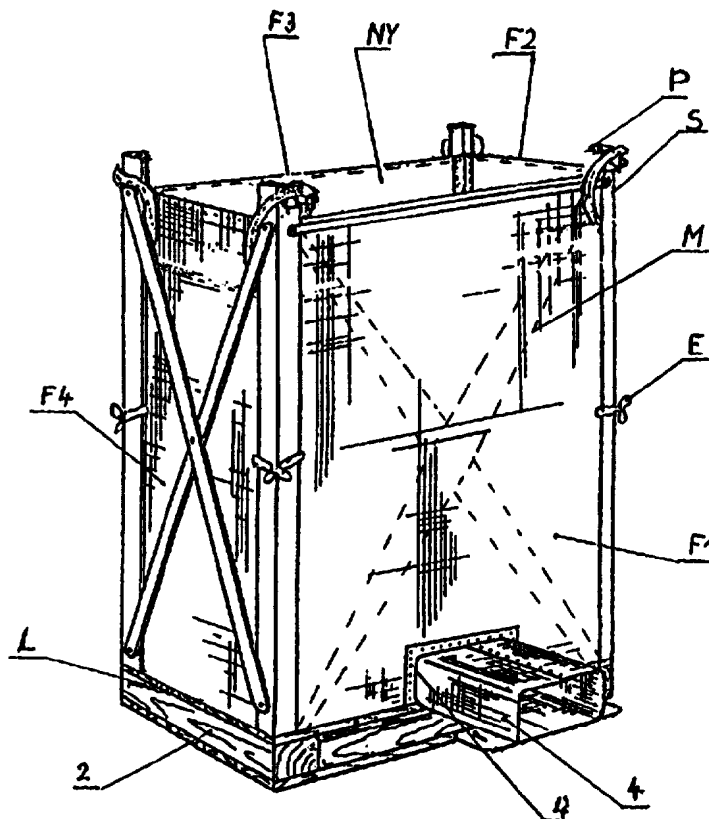
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: CONTAINER WITH FLEXIBLE SIDE-WALLS

## (57) Abstract

Container with flexible side-walls, used preferably to store and/or transport lumpy goods in bulk, primarily for use in the food industry especially in cold stores, which is of bag form connected to a pallet and preferably fit into and fastened by means of disconnectable fastening elements (E) to a frame structure (S) preferably made of some metal and is provided with an inlet opening (NY), a side mantle (P) and a base (L) connected to the side mantle (P). The container is designed in a manner that, at least on the side mantle (P), reinforcement(s) (M) formed from the flexible material of side mantle is (are) arranged in order to prevent the excessive deformation - particularly the swelling out - of the container if loaded.



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## CONTAINER WITH FLEXIBLE SIDE-WALLS

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The invention relates to a container with flexible side-walls, used preferably to store and/or transport lumpy goods in bulk, primarily for use in the food industry, especially in cold stores. More exactly, the invention relates to a bag-shaped container with flexible side-walls, preferably to be mounted on a standardized pallet (so-called big bag) which can advantageously be used especially in the fields mentioned above.

With the development of transport and storage, the large size storage units, containers and packaging solutions find their use in a number of fields. The large volume railway containers with rigid walls and of high strength are well known. Containers with flexible (soft) walls suitable to be folded up if empty can also be used for a number of purposes and are available in a wide range. For the most part, they consist of bag-shaped containers provided with lugs for suspending on the fork-lift of the truck, the design of which is essentially specified by the sort of material to be stored or transported.

For example, the Hungarian patent description No. 185 405 describes a solution for well-aired storage of agricultural products, while the Hungarian patent description No. 196 932 presents a container for storage of cereals e.g. seed-grains. The bottom plate of container charged with goods is subject to high stress when lifted; therefore, solutions to reinforce the bottom plate of containers suitable to be lifted were elaborated (Hungarian patent description No. 187 353).

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If the bottom of container is supported, the bottom plate may be of less strength and, as the case may be, the container is placed on a suitable base e.g. a pallet or equivalent and is fastened by means of suitable steel structure. A steel structure for mounting on a standardized pallet (of size 800 x 1200 mm) suitable to be used in the meat industry is described in the Hungarian patent description No. 188 376.

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Steel structures mounted on pallets are also used in cold storage plants, that are usually fastened to the steel-reinforced edges of pallet, and consist of four L-profiles connected together by means of stiffening rods diagonally arranged. At its top, the space of parallelepiped shape with base area of 0.8x 1.2 m and 1.70 m height thus formed is bordered by a frame made of flat-iron. The space is suitable to accommodate cases or - lined with plastic panels - lumpy goods e.g. frozen green peas, vegetables scraped and cut up in bulk to be stored in cold storage.

The operation of cold-storage industry is of seasonal character; during harvesting, the total capacity is reserved to accommodate and temporary storage of the yield, i.e. the emphasis is placed on cleaning and, possibly, cutting up the fruit and vegetables as well as freezing them within short time. Making up and packaging takes place at a later time which means that the frozen goods will be packaged, possibly cooked for conserve-making or delivered to other processing industries. To do this, the pallets provided with steel frame structure and, possibly, plastic panels will be removed by means of fork-lift trucks from the cold storage room and started to be discharged, mostly by means of rather complicated discharging mechanisms (see Hungarian patent description No. 188 883) or simply by lifting. If the customer needs goods only in a quantity of half a container volume, the remaining quantity raises serious problems; in fact, according to the current practice of the cold storage industry, the remaining material is not allowed to be returned to the refrigerating room; otherwise, the goods would be congealed, as it cannot be sealed again.

The German publication document No. DE/OS/3 009 173 describes a container which has a bottom of rectangular shape and four side-walls also of rectangular shape where at least one of the side-walls is provided with an outlet opening without doorstep and a lug is arranged on the top of the same side-wall.

All the known solutions relating to containers with flexible walls have the common deficiency that, in the case that a large quantity - at least several hundred kilograms - of lumpy - preferably e.g. deep frozen - goods

is stored in bulk, the original outline dimensions of the container will be changed, protrusions occurred that are susceptible to be damaged during storage, handling and transport, thus resulting in the early deterioration of the container. Similar difficulties are caused by the outlet ducts formed as a continuation of the outlet opening without doorstep, as described e.g. in the patent description registered under No. US 4 211 296.

This invention is aimed at eliminating the disadvantageous features of the known solutions and at developing a solution that, while maintaining the flexibility of walls of the container, is capable of preventing them from being protruded to a significant extent when loaded.

During the experiments, it was found that the excessive deformation of flexible container walls - especially the side-walls - under load can be reduced by removing some quantity from the material of side walls - still unloaded - and forming reinforcement(s). To do this, the flexible side-walls still unloaded shall be taken in at an appropriate place and to a proper extent.

It was also recognized that the strength of side-walls can be increased even if the walls of the container are made of polypropylene, namely of woven structure, preferably with a polypropylene laminated additional internal lining. According to my experiments, the strength of the material mentioned is the most suitable if the specific density of polypropylene lies between 150 and 250 g/m<sup>2</sup>, preferably 200 g/m<sup>2</sup>, with cloth density of 35 to 50/10 cm in both warp- and weft directions, and the density of laminated layer lies between 20 and 40 g/m<sup>2</sup>, preferably 30 g/m<sup>2</sup>.

The load tests performed also confirmed that it is the reinforcement of X-shape that is the most suitable among the various kinds of reinforcement.

The known containers of flexible wall are provided with a separate discharge opening which, in some cases, may render it difficult to use the container in a simple manner. It was also found that the inlet opening can also be used as a discharge opening, provided that the possibility of safe tilting of the container with flexible walls is ensured. Therefore, for the

fastening of the container in its discharge position, it is recommended to arrange fastening elements on the side mantle that allow the quick connection.

5       The users often require a discharge opening to be arranged on the side mantle as well. I often found that it is not always advantageous to arrange the outlet according to the known solution where an outlet duct is formed as a continuation of the outlet.

10       According to the invention, it would be preferable to arrange the container in a manner that even several outlets are arranged on the side mantle, or part of the side mantle, preferably even its full lower part - e.g. one quarter - is formed as an outlet. In a very preferable embodiment of the container with flexible walls, the outlet is designed as an opening on the  
15       side mantle in its full height.. In this latter case, the shape retaining feature that is considered to be the essence of invention shall be taken into consideration in an increased degree.

20       Thus, the invention relates to a container with flexible side-walls, used preferably to store and/or transport lumpy goods in bulk, primarily for use in the food industry especially in cold stores, which is of bag form connected to a pallet and preferably fit into and fastened by means of disconnectable fastening elements to a metal frame structure and is provided with an inlet opening, a side mantle and a base connected to the side mantle.  
25       The container is designed in a manner that, at least on the side mantle, reinforcement(s) formed from the flexible material of side mantle is (are) arranged in order to prevent the excessive deformation of the container if loaded - particularly the swelling out of the side mantle.

30       In a preferred embodiment of the container according to the invention, the container is made of woven polypropylene, preferably provided with an additional internal lining made of polypropylene laminated cloth. The solution is particularly advantageous if the specific density of polypropylene lies between 150 and 250 g/m<sup>2</sup>, preferably 200 g/m<sup>2</sup>, with cloth density of  
35       35 to 50/10 cm in both warp- and weft directions, and the density of laminated layer lies between 20 and 40 g/m<sup>2</sup>, preferably 30 g/m<sup>2</sup>.

In an exemplary embodiment of the container with flexible side-walls, outlet(s) are arranged on the side mantle.

5 In a further exemplary embodiment of the container with flexible side-walls according to the invention, the side mantle consists of rectangular side walls and the reinforcements that prevent the container from being deformed to an excessive extent when loaded are implemented from the woven polypropylene the container is made of, by means of sewing,  
10 preferably with thread of polypropylene of den 3000 to 4000 used.

In a preferred embodiment, the side walls are reinforced according to an X-shape where the flexible material of the side mantle is taken in to an extent decreasing along the two branches of the X-shape starting from their  
15 point of intersection.

In another preferred embodiment, the container is reinforced by means of several reinforcements of X-shape.

20 It is very preferable to design the container in a manner that the inlet also serves as the outlet and, on the side mantle, fastening elements that allow the quick connection are arranged for the purpose of fastening the container in its discharging position.

25 An exemplary embodiment of the invention is described based on drawings, where:

Fig. 1 shows a known solution of the container with flexible side-walls,  
30

Fig. 2 shows the preferred reinforcement on the side-wall of the container according to the invention,

Fig. 3 shows the reinforcement of multiple X-shape on the side-wall  
35 of the container according to the invention,

Fig. 4 shows a further preferred embodiment of the multiple X-shaped reinforcement.

Fig. 1 shows a known solution of the container with flexible walls in which a 4' outlet duct as a continuation of the 4' outlet is arranged on the F1 side wall. The container with flexible side-walls is of bag shape, connected to a 2 pallet, fit into and preferably connected by means of E disconnectable fastening elements to the S metal frame. The container has the NY inlet, P side mantle and L base connected to the P side mantle.

This known solution shown in the Figure has the L base of rectangular shape and four F1, F2, F3, F4 side-walls that are also of rectangular shape.

The container according to the invention is designed in a similar manner as the known solution shown in Fig. 1, except that the 4' outlet arranged on the P side mantle is not necessarily the same as that used in the known solution; that is, it is not always advantageous if the 4' outlet duct is designed as a continuation of the 4' outlet. According to the invention, it may be preferable to design the container in a manner that even several 4' outlets are arranged on the P side mantle, or even, part of the P side mantle, preferably even its full lower part - e.g. one quarter - is formed as the 4' outlet. In a very preferable embodiment of the container with flexible walls, the 4' outlet is designed as an opening on the P side mantle in its full height.. In this latter case, the shape retaining feature that is considered to be the essence of invention shall be taken into consideration in an increased degree.

Therefore, Fig 2 shows only part of the container with flexible side wall, namely the given part of P side mantle i.e. the F1 side wall where, according to the invention, M reinforcement(s) formed from the flexible material of the container are arranged in order to prevent the container from being deformed to an excessive extent - and especially, from being swelled out - when loaded.

According to the invention, the container with flexible side-walls is made of woven polypropylene, preferably provided with an additional



internal lining made of polypropylene laminated cloth. The specific density of polypropylene is between 150 and 250 g/m<sup>2</sup>, preferably 200 g/m<sup>2</sup>, with cloth density of 35 to 50/10 cm in both warp- and weft directions, and the density of laminated layer is between 20 and 40 g/m<sup>2</sup>, preferably 30 g/m<sup>2</sup>.

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The reinforcements are arranged along the  $\Delta$  diagonals of F1, F2, F3, F4 side-walls, with decreasing width towards the CS peaks, according to Fig. 2. Preferably, the M reinforcement(s) is (are) implemented from the woven polypropylene of the container, by means of sewing, preferably with  
10 thread of polypropylene of den 3000 to 4000 used.

According to my experiments, the M reinforcements are best suited to their purpose if they are of X-shape where the flexible material of the P side mantle is taken in to an extent decreasing along the two branches of the X-  
15 shape starting from their point of intersection.

According to the invention, the NY inlet is designed to serve at the same time as a discharge opening and, on the P side mantle, R fastening elements that allow quick connection are arranged.  
20

Fig 3 shows a preferred embodiment of the invention where the P side mantle and its F1 side-wall is provided with several M reinforcements of X-shape. Depending on the size of P side mantle and F1 side-wall, respectively, their material quality and the conditions of use (e.g.  
25 temperature etc.), the M reinforcements can be arranged in various manner. In Fig. 3, the M reinforcements are arranged one above the other on the F1 side-wall.

If separate 4' outlets are also arranged on the P side mantle of the  
30 container with flexible walls, M reinforcements other than X-shape can also be used; if necessary, the F1, F2, F3, F4 side-walls and parts of M reinforcements can also be overlapped.

Fig. 4 shows a solution where the X-shapes of M reinforcements are  
35 intertwined, which ensures higher resistance to load.

The container with flexible side-walls according to the invention can be made of woven polypropylene of either plane or circular design. The M reinforcements representing the essence of the invention can be implemented on the P side mantle in a simple manner, by means of sewing.

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The solution according to the invention can be used in a simple manner in various fields, preferably in the food industry, especially in the cold storage industry. The use of the container with flexible side-walls in the cold storage industry does not require any changes in the current cold storage practice. The container with flexible side-walls is fastened in the known traditional manner to the S frame structure made preferably of metal. The container with flexible side-walls can be filled with primarily lumpy goods, e.g. deep frozen products in a simple manner, on the one hand, and it can also be discharged quickly if necessary. Prior to the discharge of the container, the auxiliary device used to discharge the container by tilting up - e.g. some kind of lever system - is fastened by means of the R fastening elements arranged on the P side mantle to allow quick connection, by means of which the container can be tilted up even with a flick of the wrist. Following the discharge, the R fastening elements serving for quick connection can be disconnected and the auxiliary device - e.g. some kind of lever system - removed, thus making the container suitable to be used again as described above. The discharge can also be accomplished through the 4' outlets.

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In the case of container with flexible side-walls, the use of disposable bags of oversize dimensions made of polyethylene or even, a "protective cap" covering the NY inlet may also be justified for reason of hygiene, depending on the users' requirements.

## CLAIMS

1. Container with flexible side-walls, used preferably to store and/or transport lumpy goods in bulk, primarily for use in the food industry especially in cold stores, which is of bag form connected to a pallet and preferably fit into and fastened by means of disconnectable fastening elements to a metal frame structure and is provided with an inlet opening, a side mantle and a base connected to the side mantle, characterized by that at least on the side mantle (P), reinforcement(s) (M) formed from the flexible material of side mantle is (are) arranged in order to prevent the excessive deformation of the container if loaded - particularly the swelling out of the side mantle.
2. Container as in claim 1, characterized by that outlet(s) (4') is(are) implemented on the side mantle (P)
3. Container as in claim 2, characterized by that it is made of woven polypropylene, preferably provided with an additional internal lining, preferably made of polypropylene laminated cloth. The specific density of polypropylene is between 150 and 250 g/m<sup>2</sup>, preferably 200 g/m<sup>2</sup>, with cloth density of 35 to 50/10 cm in both warp- and weft directions, and the density of laminated layer is between 20 and 40 g/m<sup>2</sup>, preferably 30 g/m<sup>2</sup>.
4. Container as in claim either 2 or 3, characterized by that the side mantle (P) includes rectangular side walls (F1, F2, F3, F4) and the reinforcements (M) that prevent the container from being deformed to an excessive extent when loaded are implemented from the woven polypropylene the container is made of, by means of sewing, preferably with thread of polypropylene of den 3000 to 4000 used.

5. Container as in claim 4,  
characterized by that the reinforcements (M) are arranged along  
the diagonals (Á) of side walls (F1, F2, F3, F4), with decreasing width  
towards the peaks (CS).

5

6. Container as in any of the claims 1 to 3,  
characterized by that the reinforcements (M) are implemented  
by means of sewing, preferably with thread of polypropylene of den 3000 to  
4000 used, in the surroundings of the expected region of deformation.

10

7. Container, as in claim 6,  
characterized by that the reinforcements (M) are of X-shape  
where the flexible material of the side mantle (P) is taken in to an extent  
decreasing along the two branches of the X-shape starting from their point  
of intersection.

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8. Container as in claim 7,  
characterized by that it is provided several X-shaped  
reinforcements (M).

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9. Container, as in any of the claims 1 to 8,  
characterized by that the inlet (NY) is also designed as a  
discharge opening and, on the side mantle (P), fastening elements (R) that  
allow the quick connection are arranged for the purpose of fastening the  
container in its discharging position.

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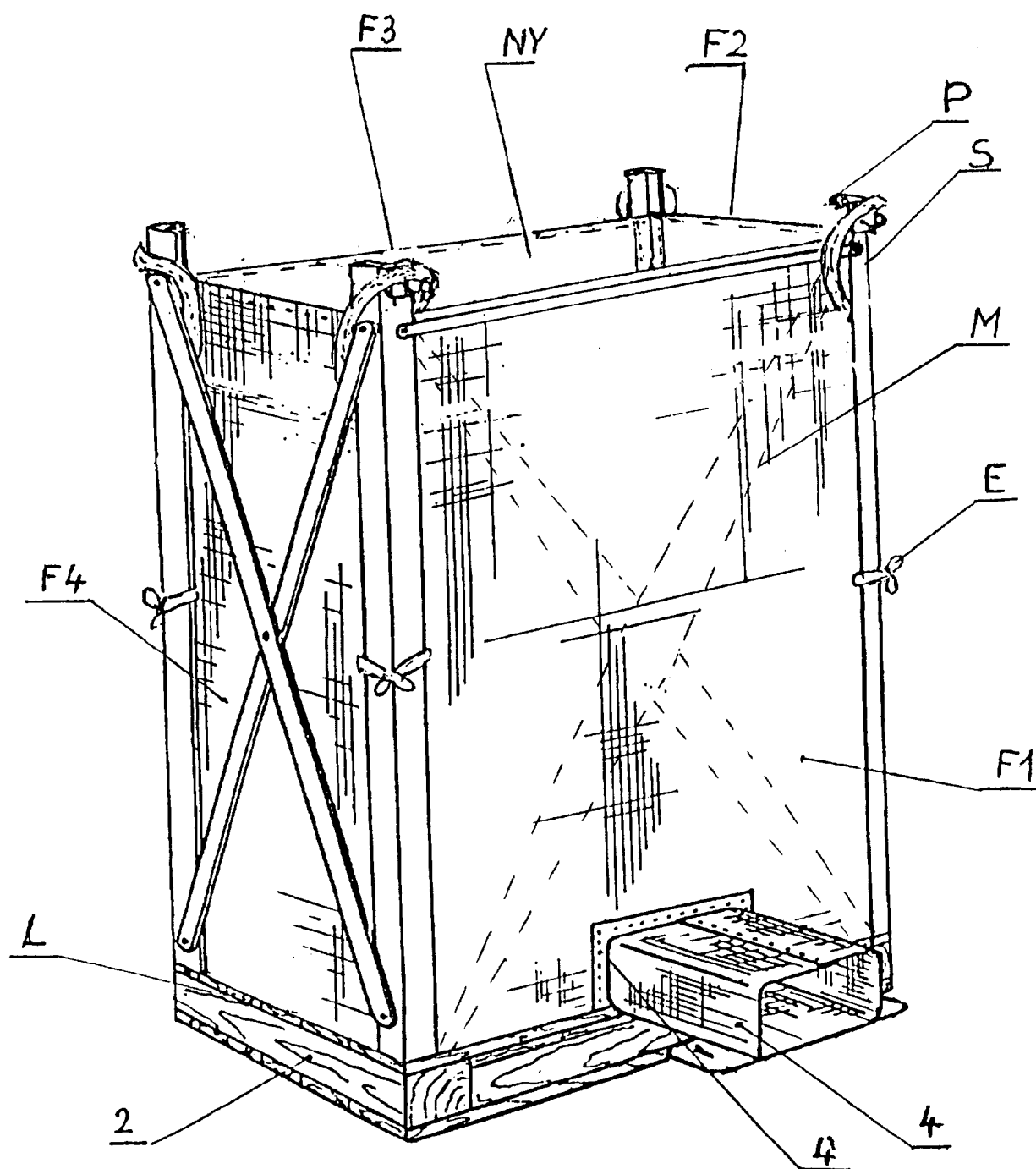


Fig.1.

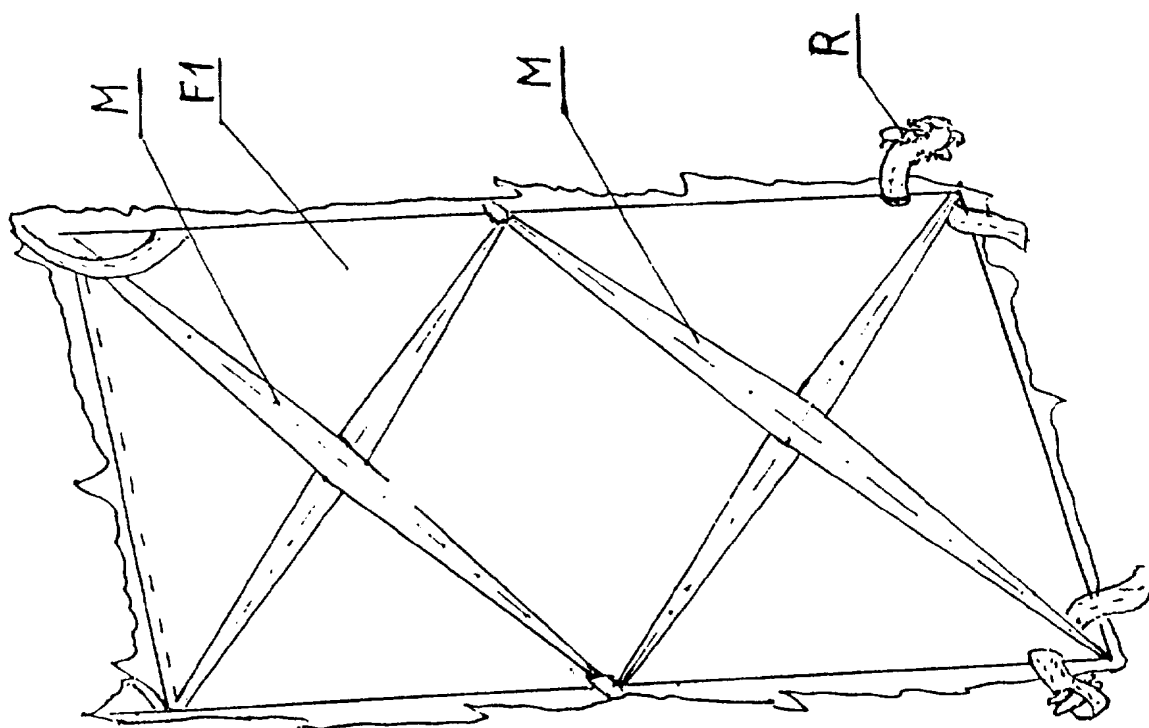


Fig. 3.

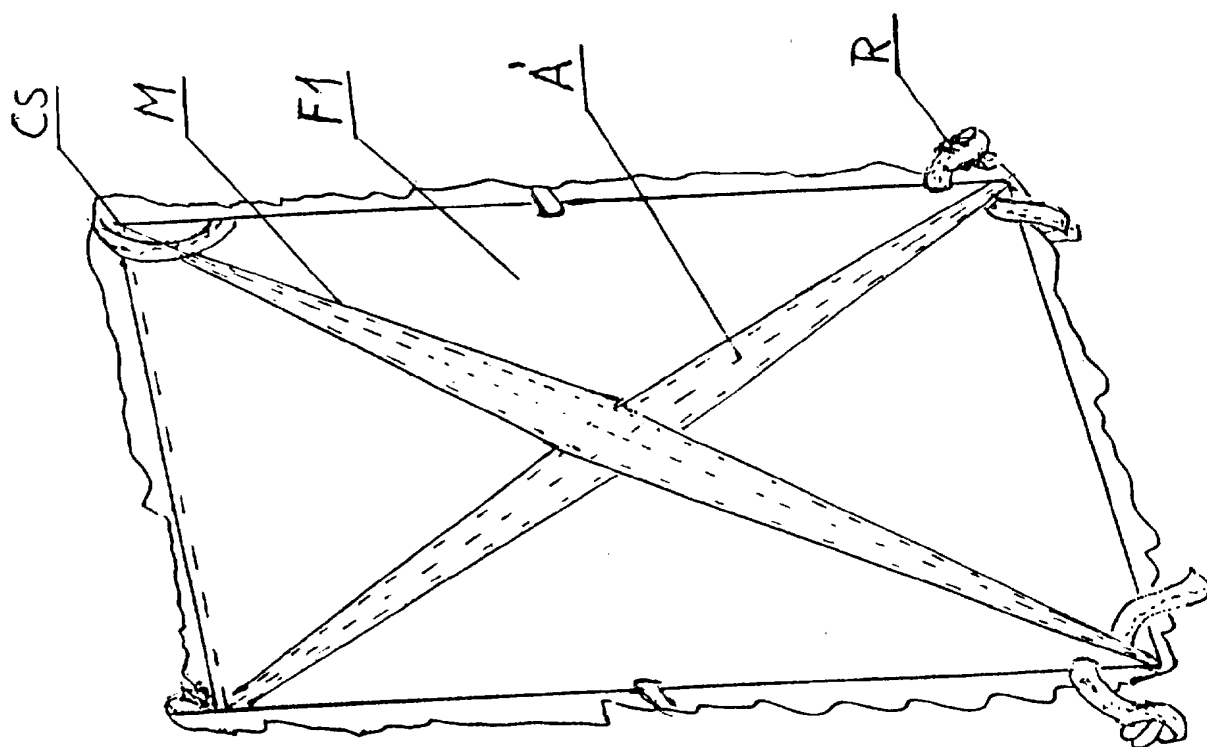


Fig. 2.

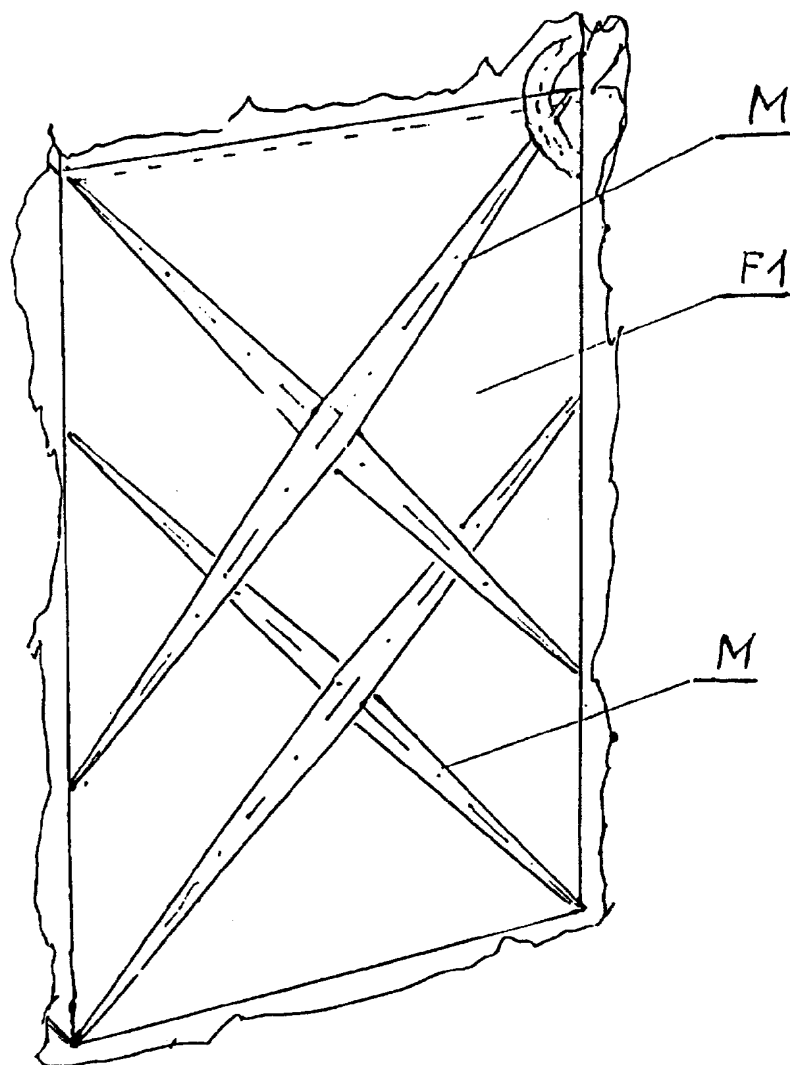


Fig.4.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/HU 97/00024

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 B65D88/16 B65D77/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 472 360 A (CONCERTAINER LTD) 26 February 1992	1,5
A	see column 1, line 50 - column 2, line 38 see column 4, line 39 - line 58; figures ---	4,6,9
A	US 4 221 296 A (FELL DON R ET AL) 9 September 1980 see abstract; claims; figures ---	1,2
A	DE 32 33 881 A (GEBHART AUGUST) 19 April 1984 see the whole document -----	1,4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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Information on patent family members

International Application No

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